

➤ **Case Report** ◀

# Coil Embolization of Recurrent Internal Iliac Artery Aneurysm via the Superior Gluteal Artery

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We report a case of recurrent internal iliac artery aneurysm previously treated with a combination of stent graft placement and coil embolization in an 85 year-old male patient. The patient was scheduled for the direct puncture embolization of the superior gluteal artery. The patient was placed in a prone position under general anesthesia. An 18G-PTC needle was inserted into the superior gluteal artery under ultrasonographic guidance. A 2.2F microcatheter was inserted through an outer needle and advanced to the aneurysmal sac. Coil embolization was successfully performed without endoleaks. This approach is technically feasible when other treatment options fail or are deemed unsuitable.

**Keywords:** embolization, iliac artery aneurysm, gluteal artery

## Introduction

The incidence of internal iliac artery aneurysms (IIAAs) is less common than that of abdominal aortic and common iliac artery aneurysms.<sup>1</sup> Minimally invasive endovascular treatment is preferred in the cases of recurrent IIAA after

proximal ligation or coil embolization of an IIAA due to retrograde flow of the distal branches into the aneurysm. Treatment options include the transarterial approach of collateral circulation via the direct puncture or the distal branch of the aneurysm.<sup>2-4</sup> Recent reports show that retrograde catheterization by direct puncture of the superior gluteal artery (SGA) is a safe method, with a low risk of pelvic organ damage.<sup>5-9</sup> In these cases, manual compression, gelatin sponge embolization, and coil insertion achieve hemostasis at the puncture site.<sup>5,7,8</sup> This study reports an SGA puncture approach with coil embolization under ultrasound guidance in the prone position for a recurrent right IIAA after hybrid repair.

## Case Report


An 85-year-old man underwent open aortic repair 5 years before presenting at our hospital. Endovascular aortic repair (EVAR) with distal coil embolization was performed for the remaining right common and internal iliac aneurysms 4 months postsurgery. Magnetic resonance imaging (MRI) showed that the right IIAA expanded from 47 to 51 mm, and there was a leak near the coil embolization distal to the aneurysm (Fig. 1). Therefore, an additional coil embolization was planned. A transcatheter arterial approach via the femoral artery is often technically difficult because of its complex collateral circulation based on our experience. The patient and his family requested that we perform the less invasive therapy. Therefore, we decided to embolize the right IIAA using the right SGA approach. With the patient in the prone position, the distal branch of the SGA outside the pelvis was punctured using an 18G × 35 cm PTC needle (Hakko, Nagano, Japan) under ultrasound guidance (Fig. 2). A 0.035-inch Radifocus guidewire (Terumo, Tokyo, Japan) was carefully inserted into the aneurysm, and the PTC needle was then replaced with a 10 cm-long outer needle, 17G-Happycath (Medikit Co., Tokyo, Japan). Next, a 2.2F-Coiling Support (HI-LEX Corporation, Takarazuka, Japan) was advanced to the anterior aspect of the right IIAA using an 0.016-inch AQUA V3 guidewire (ASAHI Inc., Seto,

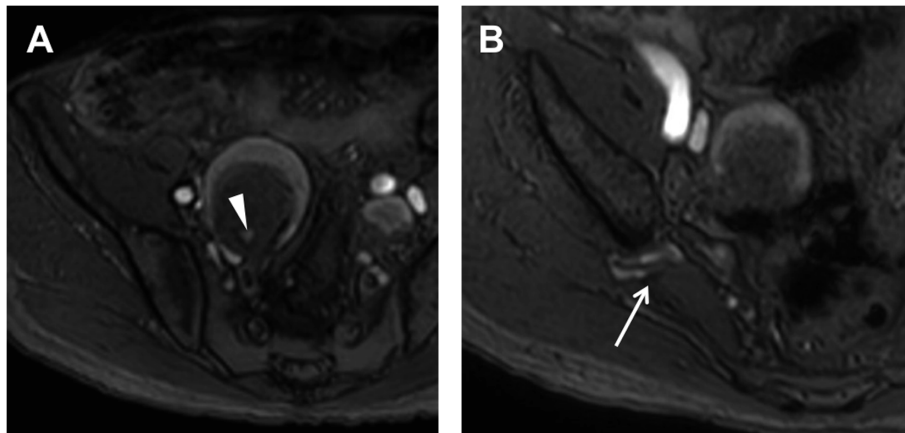
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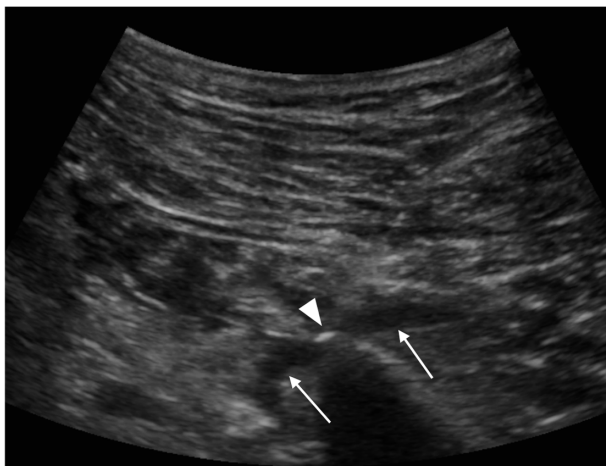
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**Fig. 1** Magnetic resonance imaging (turbo field echo) displaying enlarged right internal iliac artery aneurysm with endoleak (arrow) communicated to the right superior gluteal artery (arrowhead).



**Fig. 2** Right superior gluteal artery (SGA) puncture under the ultrasound guidance in the prone position (arrows; SGA, arrowhead; puncture needle).

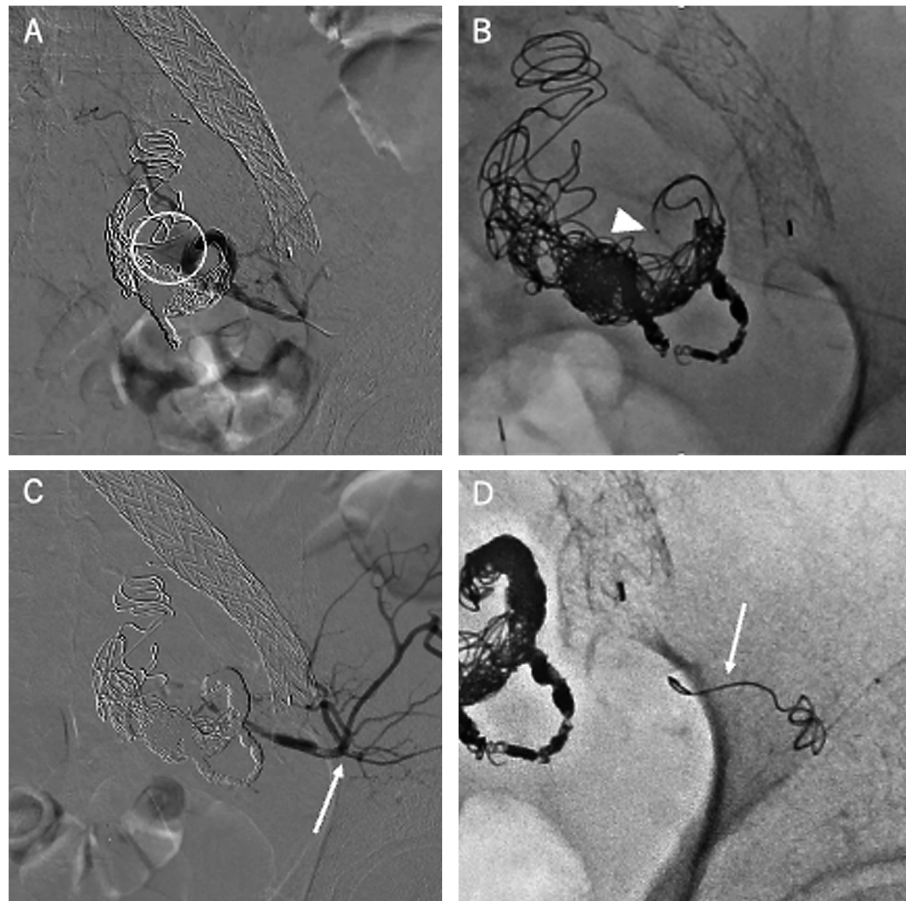
Japan). The right SGA angiography showed an endoleak connected to the SGA, inferior gluteal artery, and internal pudendal artery (Fig. 3A). These branches were selectively embolized using various detachable coils (Fig. 3B), and then, a complete embolization was achieved (Fig. 3C). For hemostasis, a 4×10-cm 0.018-inch coil (AZUR18; Terumo, Tokyo, Japan) was used to seal the puncture site from the endovascular space to the extravascular space, and the procedure was completed (Fig. 3D). No procedural complications were noted. The patient was discharged 5 days postoperatively. An MRI performed 6 months later showed no obvious endoleaks, and the patient's clinical course was unremarkable.

## Discussion

The percutaneous SGA puncture approach is useful for

recurrent IAA previously treated with open or endovascular repair if other approaches are challenging. Embolization by direct aneurysm puncture has the advantage of being close to the target but carries the risk of pelvic organ damage and rupture if unsuccessful. The transcatheter arterial approach via the deep femoral artery may allow us to reach the aneurysm sac, but it has a high probability of failure owing to the complexity of the collateral pathway. SGA punctures can resolve these issues. The SGA is distributed from the pelvic cavity to the buttocks through the foramen magnum, and its distal branch is readily visualized using ultrasound.

The ideal method for hemostasis at the puncture site remains debatable. Common hemostasis methods include manual compression, gelform embolization, and coil insertion.<sup>5,7,8</sup> Among these, the manual compression may be inadequate because of the deep location of the vessel. In addition, hemostasis using gelform or other embolic substances carries the risk of the embolic substance flowing into a vessel other than the target site. Conversely, hemostasis using coil insertion can reliably seal the puncture site from the endovascular space to the extravascular space, thereby reducing the risk of distal embolization. In choosing coils for hemostasis, it is appropriate to select the coils that match the diameter of the puncture needle. Although sheaths have been used for SGA puncture, using an outer needle of 17G-Happycath enables catheterization without sheaths and reduces the risk of bleeding without widening the puncture site. Herein, an 0.018-inch AZUR18 coil with hydrogel swelling (expanded to 0.032 inch) was implanted to seal the puncture site because the diameter of the 18G-PTC needle was 1 mm, which equates to 0.040 inch. Thus, AZUR 35 coil or inexpensive 0.035-inch fiber coils are also expected to be useful. A liquid agent may be another option, but it has a potential risk of distal embolization.



**Fig. 3** Angiography via the right superior gluteal artery showing an endoleak (circle) communicated to several involved branches (A). These branches are selectively embolized using several detachable coils (arrowhead; the tip of the microcatheter) (B). Completion angiography showing the disappearance of endoleak (C). Hemostasis with a coil placed from the endovascular area across the subcutaneous soft tissue at the puncture site (arrow) (D).

This technique has several limitations. First, the approach cannot be used when SGA is not open. Second, there is a potential risk of bleeding if the puncture fails. We intend to evaluate this technique further.

## Conclusion

The percutaneous SGA puncture approach is useful for recurrent IIAs previously treated with open or endovascular repair, in cases where other approaches are challenging.

## Patient Consent

Written informed consent was obtained from the patient.

## Disclosure Statement (COI)

All authors have no conflicts of interest that could influ-

ence this report.

## Author Contributions

Data collection: TF, YO

Manuscript preparation: TF, YO

Critical review and revision: all authors

Final approval of article: all authors

Accountability for all aspects of the work: all authors

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